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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/759,885	01/15/2004	Edward W. Sheridan	EM- 1989	8465

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PEACOCK MYERS, P.C.
201 THIRD STREET, N.W.
SUITE 1340
ALBUQUERQUE, NM 87102

EXAMINER	
SAVAGE, JASON L	
ART UNIT	**PAPER NUMBER**
1775	

DATE MAILED: 03/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/759,885	SHERIDAN ET AL.	
	Examiner	Art Unit	
	Jason L. Savage	1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-22 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-22 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 01/15/04 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Double Patenting

Claims 1-21 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 14 and 5-8 of copending Application No. 10/923,865 of Sheridan et al. (US 2005/0189050). Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 14 of Sheridan recites an energetic material comprising layers of a first reducing material and an oxide. Claim 5 of Sheridan further claims that the reducing material is a metal. Although Sheridan does not claim the layer thicknesses, it would have been obvious to one of ordinary skill in the art to have provided the layers in any thickness that would make the energetic composition suitable for the use in which it would be intended.

Regarding claims 3-6 of the present invention, although Sheridan does not claim there are pluralities of each layer formed, it would have been obvious to one of ordinary skill in the art to have provided multiple layers of each of the material layers such as is depicted in Figure 2 of Sheridan.

Regarding claims 7, 9-10 and 18-19, claim 6-8 of Sheridan recites that the metal material may be Al, Ti, Li, Mg and may be in hydride form and the oxide material is an oxide of phosphorus.

Regarding claim 8, claim 1 of Sheridan recites the oxide is of phosphorus.

Regarding claims 11 and 20, although Sheridan is silent to the use of interstitial hydrogen, it would have been obvious to one of ordinary skill in the art to have provided the metals in the form of interstitial hydrogen.

Regarding claim 13, although Sheridan does not claim adhering the composition to a substrate or the materials used, it would have been obvious to have formed the composition on a base substrate of any of the materials claimed.

Regarding claims 15-16, Sheridan teaches phosphorus and Mg may be used, as such, it would meet the claim limitations after the material is detonated.

Regarding claim 17, the energetic composition of Sheridan would have been just as useful for use in a tampering device as that claimed by Applicant.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-13, 15 and 17-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Danen et al. (US 5,266,132).

Danen teaches an energetic material comprising a plurality of layers **A** and a plurality of layers of materials **B** which are reactive with one another wherein the layers have thicknesses from between 1-1000 nm (col. 2, ln. 16-68 and Figure 1). Danen further teaches that the layers may comprise a metal such as aluminum and an oxide such as cupric oxide (col. 3, ln. 15-33).

Regarding claim 5, Danen teaches that layers A and B are adjacent to one another (Figure 1). In the alternative, although Danen teaches a buffer layer **b** is formed between them, Danen teaches that the buffer may be a self-buffering which results from an initial reaction between adjacent layers of the layers **A** and **B** (col. 3, ln. 15-33). As such, the composite of Danen would meet the limitation of layers **A** and **B** being adjacent to one another.

Regarding claims 7-11 and 18-20, Danen teaches that the reacting materials may include aluminum, titanium, magnesium, lithium and hydrides thereof and that the oxide materials may include Fe (col. 5, ln. 9-44).

Regarding claim 12, the sputtering deposition of Danen (col. 3, ln. 43-62) would result in the same composite as that claimed by Applicant.

Regarding claim 13, Danen teaches composite may be formed on any conventional substrate material including those claimed by Applicant (col. 4, ln. 20-30).

Regarding claim 15, Danen teaches the same energetic material structure as that claimed by Applicant. Furthermore, Danen teaches the composite is suitable for use in explosive applications (col. 1, ln. 9-15). As such, one would expect that energetic fragments would form upon detonation just as that claimed by Applicant.

Regarding claim 17, the energetic material of Danen would be just as suitable for use in an anti-tamper device as the energetic device claimed since Danen teaches the same structure which is claimed.

Claims 1-4, 6, 12-13 and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Makowiecki et al. (US 2002/0092438).

Makowiecki teaches an energetic material comprising a plurality of metal layers **8** such as titanium and a plurality of oxide layers **9** wherein the layers have thicknesses from between 1-1000 nm (par [0044] and Figure 2).

Regarding claim 12, the sputtering deposition of Makowiecki (par[0046]) would result in the same composite as that claimed by Applicant.

Regarding claim 13, Makowiecki teaches a substrate such as tin **11** is used (par [0044]).

Regarding claim 17, the energetic material of Makowiecki would be just as suitable for use in an anti-tamper device as the energetic device claimed since Makowiecki teaches the same structure which is claimed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Danen et al. (US 5,266,132)

Regarding claim 14, Danen teaches what is set forth above however it is silent to the energetic material comprising the materials claimed. However, Danen teaches the composite is suitable for use in explosive applications (col. 1, ln. 9-15). As such, it would have been obvious to one of ordinary skill in the art to have employed energetic materials typically employed in explosive applications such as those claimed into the energetic material of Danen with a reasonable expectation of success.

Regarding claim 16, Danen does not exemplify an embodiment wherein fragments of the detonated energetic material would comprise Mg and P. However, Danen does recite that Mg and the reaction product formed by reaction of Mg is suitable for use in the energetic material (col. 5, ln. 30-34). Absent a teaching of the criticality or showing of unexpected results from the detonated material containing some amount of P in the formed Mg containing fragments, it would not provide a patentable distinction over the prior art of Danen,

Claims 5, 8 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Makowiecki et al. (US 2002/0092438).

Makowiecki teaches an energetic material comprising reactive layers of metal and oxide, however it is silent to teaching that the layers of metal and oxide are adjacent to one another. However, Makowiecki teaches that reactive layers may be placed adjacent to one another (par [0052] and Figure 3A). Makowiecki further teaches

that number of other materials selected for the reactive layers place adjacent to one another (par [0054]). Makowiecki also teaches that reactions between metals such as Al, Ti, Be and oxides of CuO, Fe_2O_3 is known and has long been used (par[0045]). As such, it would have been obvious to one of ordinary skill in the art to have recognized that other materials could be employed for two material energetic material of Makowiecki employing reactive materials such as metals and oxides adjacent to one another since with a reasonable expectation of success.

Regarding claim 8, it would have been obvious to have used an oxide of Fe since Makowiecki teaches that it is known in the art that the combination of a metals such as Al and oxides such as Fe_2O_3 is suitable for use as reacting materials.

Prior Art not Relied Upon

The following is a listing of prior art which as deemed pertinent to the present invention however it was not relied upon in the rejections above:

Dreizin et al. (US 2006/0053970) teaches an energetic material comprising thin metal phase layers of Al and thin oxide phase layers of iron oxide (par[0035]).

Anderson (US 2004/0265214) teaches an energetic material composite comprising a reactive metal material having an adjacent oxide layer (par[0007]). Anderson further teaches that a wide variety of materials are known for the metal material including aluminum, magnesium, titanium and silicon among others (par[0033]). Anderson further teaches that the oxide may be formed from materials such as manganese oxide, iron oxide, transition metal oxides among others (par[0038]).

Weihs et al (US 6,534,194) teaches an energetic material comprising alternating layers of materials that react (col. 3, ln. 30-42). Weihs further teaches that it is known to provide reactive materials in alternating layer form as opposed to powder mixtures in order to achieve reactions with more controllable and consistent heat generation and reaction propagation (col. 2, ln. 3-19).

Nielson et al (US 6,224,099) teaches an energetic materials comprising metal materials including hydrides and oxidizing materials including materials such as RDX (col. 3, ln. 50-67).

Hinshaw et al. (US 5,439,537) teaches an energetic material comprising metal material and an oxidizing agent to form oxide portions. Hinshaw further teaches that hydrides of the metal may be employed in the energetic material (col. 3, ln. 25-48).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Savage whose telephone number is 571-272-1542. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jason Savage
3-15-06

JENNIFER MCNEIL
EXAMINER
3/16/06